

PROJECT INDALO

History of the Accident at Palomares, Spain

- On January 17, 1966, during a refueling operation, a U.S. Air Force KC-135 tanker and a B-52 bomber carrying four nuclear weapons collided and disintegrated over Palomares, Spain, a village of about 1500 people. One crew member survived.
- Two nuclear weapons were recovered intact. Two others experienced detonation of the high explosives on impact. There was no nuclear yield and no one on the ground was seriously injured.
- Approximately 560 acres of predominantly agricultural area, including the village of Palomares, was contaminated with plutonium-239.
- Contaminated vegetation was collected for disposal. Contaminated soil was scraped into piles, loaded into trucks, and collected in a holding area where it was packaged for shipment to the United States for disposal. A large area was watered down and deep plowed.
- The contaminated vegetation and soil from Palomares was transported by ship to Charleston harbor and transported to the Savannah River Plant for land burial.
- In the Hall-Otero Agreement, signed Feb. 25, 1966, between the United States and Spain, the U.S. agreed to provide technical and advice to Spain for radiological followup of Palomares residents and their environment. This assistance, Project Indalo, has continued for over 25 years.
- Dr. Emilio Iranzo, Director of Project Indalo in Spain, published a report in Health Physics, (52:4, 1987) entitled "Air Concentrations of ²³⁹Pu and ²⁴⁰Pu and Potential Radiation Doses to Persons Living Near Pu-Contaminated Areas in Palomares, Spain" (attached).
- DOE and its predecessors have been funding about 20-25% (\$250K-300K) of the annual cost to monitor soil, air, vegetation, and residents.
- Scientists from both Spain and the DOE have cooperated in the exchange of information and investigational techniques. Spanish scientists visited LLNL and BNL in April, 1993.
- Scientists from LLNL visited Palomares in June, 1993 and conducted resuspension studies to evaluate the extent to which soil contamination is resuspended into the air under various activities and to obtain both soil and vegetation samples for analysis.
- BNL is cooperating with Spain in the analysis of urine samples using a newly developed highly sensitive technique called "fission track analysis" which can detect Pu in urine down to natural environmental levels.